62932

IDRC-Lib
62932

Information
Sciences
Archival Copy

VIIth IAALD World Congress
Ottawa, Canada
June 2-6, 1985

MOBILIZING LOCAL CAPABILITIES FOR MORE EFFECTIVE EXCHANGE OF INFORMATION IN DEVELOPING COUNTRIES: AGRICULTURE AS AN EXAMPLE.

K. P. Broadbent, Associate Director
Information Sciences
International Development Research Centre
Ottawa, Canada K1G 3H9

Summary

Without proper programs and selectivity in the application of appropriate technologies, training and funding, the development of information systems and services in developing countries will not operate effectively and will have little chance of long-term success. Information must meet the needs of each group of users.

It is more and more evident that scientists, technologists, and extension workers need a whole package of information about a particular subject rather than documents alone. They ought to communicate rapidly, effectively, and in the most appropriate form, the results of new research which has to be addressed in the context of local situations. There are three meaningful components: good research, good education and good information management. The kind of institutional structure in which these components are carried out will vary from country to country but it must be noted that whatever the internal conditions of an individual country the organization of a useful, productive national scientific information system is not independent of the broader historical forces that have fashioned the nation's cultural, political and economic system. The real problem is how to take that system already operating in an individual country and to introduce into it modifications, often in a pragmatic manner, until, in time, there has been created a trinity of the three components which together will match the research base and information delivery system.

ARCHIV
BROADB
NO. 19

IDRC-doc 446

Although some countries have made rapid progress in agriculture in recent years, many developing countries have experienced slower rates of growth. In particular, the balance between population and land is being upset by changes. The rapid increase in population of poorer countries, which are growing between 2.2% and 3.0% per year, leading to a doubling of numbers in 25 to 40 years, is upsetting the land/population equilibrium wherever good farm land is in short supply. The increasing livestock populations in the semi-arid zones are increasing desertification, by overgrazing, soil exhaustion and erosion. Many countries are net importers of food and some are experiencing famine. Added to these problems are the effects of weather patterns, reductions in water supplies, problems of disease and sanitation. With lack of capital and poor technology, many countries find themselves in a classic low level equilibrium trap where farming and technology is at such a low state of development that the cost of investment in modernization does not produce sufficient rate of return to the farmer to encourage further investment in technology. The same situation is true of the information infrastructure.

It is, however, widely accepted that many of these problems, though difficult, could be overcome with greater applications of science and technology, linked with adequate transfer of information. Although there are dangers in oversimplifying the complex processes of development, most recognize that without proper programs and selectivity in the application of appropriate technologies and modern methods, the development of

information services in developing countries will not operate effectively and will have little chance of long-term success. Information must be all-embracing, deal with each sector and must meet the needs of each user group. By this I mean the management of information in agriculture involves a hierarchy of users: the operators, the advisors, the managers, the planners, the scientists/research workers and policy makers at the ministerial level. Similarly, the information being manipulated by this hierarchy of users consists of the physical/biological components (soils, nutrients); the production mode (land labour capital); the management method (cropping/farming system, cost constraints); the policy medium (laws, regulations, taxation) and the value system (rural/social context marketing). One of the chief bottlenecks which has limited agricultural development has been the slow progress in enabling those who make up the vast majority of the rural populations of developing countries to make use of science and technology to solve these problems. Another is providing the right packages of information to decision/policy makers for formulating agricultural policy issues and food supply plans.

Farmers who are more educated and who are farming on a bigger scale in the industrialized countries are in a position to seek out information on technologies which will benefit them directly. They also have a wide range of information packages at their disposal and extension officers to help them test and adapt them to local conditions. Decision-makers have a vast array of data bases at their disposal.

Many developing countries have retained the Research and Extension services which were established in colonial times. In those days, great efforts were made to provide foreign expatriates to work in these institutions. Some still depend on them. The flow of information would be designed to assist government programs in the production and marketing of export crops. There was a fair degree of literature published in the form of technical reports, workshop proceedings and annual reports. After independence, larger numbers of specialized workers were hired, the emphasis on subsistence crops prevailed, often without the information back-up required to assist research and extension workers to do their jobs. Foreign exchange became a problem. Many of the excellent libraries established in colonial days declined as a result of lack of cash to purchase subscriptions. Lack of communication and scientific editing skills hampered the publication of research results. Although some good work was done by a few outstanding individuals, in many countries scientists tended to confine themselves to their research stations with little contact being made to the farmers they served. One extension worker per one thousand farmers was not an uncommon situation.

There are three basic elements to be considered in combatting low productivity in agriculture: good research, good education and good information management. All three need to work in harmony. A constant free flow of information is very important through all levels of research. This requires highly developed linkages between the farmers, local and central government, politicians and planners. The kinds of

institutional structures in which these linkages are carried out will vary from country to country but it must be noted that whatever the internal conditions of an individual country, the organization of a useful, productive national scientific information system is not independent of the broader historical forces that have fashioned a nation's cultural, political and economic system. The real problem is how to take that system already operating in an individual country and introduce into it modification, often in a pragmatic manner, until, in time, a trinity of the three components has been created which together will match the research base and information delivery system.

In the early stages of development, few countries can be expected to have in place a well-ordered system for retrieving and disseminating information. The first precept then is to establish definite goals and targets to keep track of all locally produced documents. National agricultural bibliographic control will enable a first stage to be set in creating more useable information at all levels. In addition, some form of agricultural/rural development service will be required from which to launch extension and advisory services. Where farming systems have opened up new possibilities for the adoption of new crops, there will be scope for more specialized information activities to select and analyse information on these crops. The main consideration is the necessity to link all information activities together. The other is to nurture what indigenous resources are available.

In developing countries, agricultural colleges and universities often play a crucial role in the information process. Such institutes not only train agricultural scientists and extension workers, but also carry out valuable research and publish a lot of literature. Their libraries are a great repository of knowledge. Good examples of this are Ahmadu Bello University in Northern Nigeria, Kasetsart University in Thailand, the Alamaya Agricultural College in Ethiopia and the University of the Philippines at Los Banos. In many cases, these colleges and universities have become the focal point for collecting national agricultural information and providing access to documents. Very often these Universities are also the links to international co-operative information systems such as AGRIS. In this way they have been uniquely placed to play the triple role: innovative research, education and information management.

A key issue in improving the transfer of information on agriculture is training of information staffs. In many developing countries, there is a paucity of human skills available to handle the mass of scientific literature. The value of any information service is primarily dependent upon the quality of the available human resources. Therefore, it is assumed that every country will wish to give the highest priority to the selection and training of staff for their information services. Unfortunately, this is rarely the case. Library and documentation services tend to be the poor relatives in any government structure and receive least consideration when it comes to training opportunities. Few

formal courses are available in the developing countries themselves and most would-be entrants to the field of information science must try to obtain admittance to the library schools of North America, Australia and Europe. Now it is a fact that many of the courses offered at these prestigious institutions are not relevant to the needs of developing country staffs, who must, for the most part, deal with low library budgets in their own institutions, poor quality of reference materials, inadequate staffing measures and a myriad of other constraints from lack of electric power to bad transportaion facilities. Another serious drawback, as records show, is that many students fail to return home; or if they do, soon emigrate taking their new found skills with them. The problem is how to train and educate the right people in their own environment. Given the fact that it may not be possible to establish library schools in every country, students from developing countries should try to obtain places on courses in neighbouring countries. India provides some very good courses at different levels of information training and practice which would be appropriate on a regional basis, where environmental, technical and socio-economic conditions are very similar to the student's home countries. The international agricultural research centres have further strengthened the developing countries in this respect. The International Rice Research Institute (IRRI) established an information department in 1964. In recent years, requests from national programs for training have increased. Similarly, the

International Livestock Centre for Africa (ILCA) have had so many requests for training in information that they decided, this year, to offer a formal course.

Turning away from the problems of training to the area of technology, we find that the developing countries now face a bewildering array of new information technologies. But are they appropriate? Too often project planners are more interested in introducing the most recent hardware/software configurations than in particular problems of administrative and management systems in which the technology is to be housed. The computer should not be decided upon until competent advisors have had a chance to evaluate the information needs and services required. Any assessment should include a thorough analysis of the institution's existing capacity for handling information manually. Policy recommendations must include such important items as standards and compatibility. A phenomena that is often experienced in developing countries is the introduction of too much, too soon, usually because needs are assessed as "expected" needs rather than actual needs, and very often advice is obtained on the experiences of developed countries. An incremental approach is preferable in every case. More sophisticated technology can always be added as progress is made. Expensive microfiche reader/printers are useful if there is volume of service. A complete microfiche laboratory based on a step-and-repeat camera will only be

useful and economic if the number of documents to be copied merits the expense and throughput can be maintained. In many cases, it will be simpler to get documents microfiched through a local service bureau.

The second Law of Thermodynamics says that an isolated system, if left to its own devices, will go from a state of order to a state of disorder quite rapidly. To prevent this, one must pump energy into the system. Applied to the handling of information, this means that maintenance of gains made in the information infrastructure requires constraint funding, devotion of effort and frequent renewal. If the momentum is to be kept up, even greater devotion and efforts will be required. No amount of donor funding will suffice for long-term commitment on the part of governments. The information infrastructure of many of the poorer developing countries, if it exists at all, is in particularly acute danger of relapse or collapse not only in its formative stages, but also well into its mature years. All it requires is an indifferent government to give it a potentially fatal blow.

How then, once established, can an information service serving agriculture in developing countries be expected to establish and sustain itself? There will be many varying factors applicable in very local situations, but four stand out as very basic and common necessities:

1) **Purpose:**

both on a collective and individual level, an information service must have a definable subject scope; there must be a clientele and there must be a mandate to serve;

2) **Sustainability:**

by provision of long-term financial assistance. Information is a commodity which everyone deems necessary but for which seemingly no one is interested in paying an economic price. To be profitable is beyond the dreams of most but the highly commercialized data bases. Some form of subsidy is necessary. But no one should think of setting up an information service without some idea of the long-term costs. In many developing countries we have to acknowledge that political turmoil is often the order of the day: governments rise and sometimes fall and library and information services often suffer from this turbulent world. Under such circumstances, self reliance becomes a a way of life;

3) **Investment in Quality Staffs:**

as reflected upon earlier, many developing countries are hampered with predominently low quality personnel, thus giving rise to services with high expectations but low productivity which in turn leads to lack of local credibility and ultimately low levels of government funding; and

4) Compatibility:

to facilitate international transfer.

Information transfer, to increase development, has to consist of several elements if it is to be useable: a verifiable source, a system closely linking the source to the user and a user with sufficient education and skill to use the information or someone who can interpret the information. An important point to consider is that the information must have an end use because the storage of information is increasingly costly. It is highly important that only important, key items are stored for retrieval purposes. Because information in the field of agriculture is more and more technical in nature, the need to package the information to be of use is increasingly important. Information systems often neglect the person-to-person contact. It must also be remembered that the user requires information contained in the published literature and not the literature itself. Extension agents need synthesized or repackaged information and the farmer needs information in an easily assimilated form.

In development countries, very often it is not possible for scientists or farmers' unions, if they exist, to meet regularly at conferences or seminars. It is also not easy for them to obtain special kinds of information. The role of specialized information centres can help alleviate this problem by putting users in touch with each other,

answering special queries and reviewing the literature in a very narrow subject field. A good example of this would be the Philippine National Rootcrops Information Service which is able to intensively analyse the literature for a very sharply defined group of crops of local interest and is closely linked to the local farmers through the Philippine Root Crop Research and Training Centre. This information service is located at the Visayas State College of Agriculture in the Central Philippines. Amongst its specific objectives is the establishment of linkage between agricultural decision makers and planners, the scientific community and the farmers through extension agents. The service acts as a focal point for two-way flow of information so that continuous feedback helps shape future research work. There are also linkages to the National Agricultural Documentation Service and, through this, to the regional and global services of AGRIS. There are also lateral links to specialized information services at the major international agricultural research centres such as the Centro Internacional de Agricultura Tropical (CIAT) and the International Institute of Tropical Agriculture where typical root crops are intensively researched. The service is able to analyze the pertinent literature, provide state-of-the-art reviews, technical reports of significant developments and put the farmer in contact with the scientist through a closely maintained system of information analysis. Enquiries of a scientific nature that cannot be answered immediately by the staff of the College are directed to the most appropriate individual locally or abroad through an inventory of root crop scientists. A national specialized information centre of this kind

is very rare; in fact, the Philippine case is probably unique. Its success may be judged by the national commitment, its clientele and its dedicated staff, but its development owes much to the earlier models such as the Cassava Information Centre which was established at CIAT in the early seventies. The Cassava Centre began with the collection of documents and compilation of a major bibiography on the subject. It represented a very tightly defined subject scope and a small body of literature. Along with its obvious achievements in supplying to its select group of users special packages of information over the past thirteen years, a recent evaluation was able to conclude that in terms of time saved per cassava worker and cost per user, the benefits from the centre's services exceeded costs. The investment of the information worker's time was estimated in the order of seven hours per user year, and the time saved per user was estimated to be much higher. The dollar investment was only some 40 Canadian dollars per user per year which has to be compared with the time saved, the better informed state that the Cassava information services provided over other means, the avoidance of duplication and the more productive forms of research and application. In other words, the benefits exceeded the costs.

Both these examples provide lessons for those seeking to establish information services in any field. Many information services, we know, grow from rudimentary beginnings, but they can never achieve their ultimate purpose unless they have a mandate, a user community, a tightly defined subject scope and the work is tied in with a credible

institution, -- the "Centre of Excellence" concept. Both CIAT for Cassava and the Visayas State College of Agriculture are centres of excellence. They are closely associated with the practising scientist. They are uniquely placed to help national capabilities. Mobilization of sources for information work, especially in the early stages, is a relatively slow process. Planning needs to consider a period of several years ahead. Start-up costs are high, but operating costs are subject to the inflationary spiral. A recent meeting on the subject of information centres, sponsored by IDRC, estimated that any new information centre in the development stage should count on an expected lifetime of at least ten years. But long-term financial support from local sources seldom can be generated over as long as a decade. This is a serious impediment to progress. Planning becomes piecemeal, it is difficult to attract staff, important activities have to be postponed, new activities in response to user's needs are not contemplated. Financial planning is, therefore, crucial to the development of services and needs to take account of the following avenues of assistance: revenue from sales and/or charging for services, but in the developing country situation, the user is unlikely to be able to pay full cost-recovery prices. The Asian Institute of Technology, for instance, whose regional library and documentation centre provides several specialized information centres, after years of experience came to the conclusion that they will probably never recover more than half the annual operating costs.

The budget has to be made up from elsewhere, usually with donor agency support, but this is never a long-term proposition; one must look to indigenous sources of funding - most appropriately, the country's own government, or the private sector. Many private companies need to appear altruistic and their contributions in some cases can be tax deductible. The Rubber Research Institute of Malaysia, for example, is funded by means of a "Cess" or tax on the quantity of rubber exported. Another form of finance often overlooked are co-operative and self-help projects such as the carrying of advertising in various publications. In developing countries short of foreign exchange, information centres might also consider the introduction of coupon schemes to assist institutes to purchase publications.

Information services must provide the right information in the right place at the right time and in the right form. Who has not heard that phrase before? The more academic among us blush, of course, to say anything so unsubtle, but the unsubtle is sometimes also very important. In stating this, it is now more than ever very important to consider that agriculture as a subject is increasingly complex, not only involvig the age-old occupations of animal husbandry, cultivation of traditional crops but new sciences such as cell tissue culture. Information transfer is increasingly complex. The role of the intermediary step of documentation and hard copy is decreasing while direct transfer of scientific, numerical data is increasing. Management decisions that need to be taken at all levels in the agriculture industry are more and more based on

scientific principles. Evaluation and validation of information on basic research in developing countries is less and less possible unless we consider making available more resources and technical know-how and we consider breaking the dependency relationship on the services offered by developed nations many of whom are competing amongst themselves in providing information services. The developing countries themselves have to place more emphasis on information as an indispensible tool of science and technology and recognize that the cost of the intellectual effort required for the total task exceeds the perceived direct market value of the end product to the user. The more "basic" the science, like agriculture, the more infusion of seed-money and long-term investment of funding will be required.